

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 23 DEC 2004

Applicant's or agent's file reference PCT 1895UW033/c	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/07189	International filing date (day/month/year) 04.07.2003	Priority date (day/month/year) 08.07.2002
International Patent Classification (IPC) or both national classification and IPC H04R31/00		
Applicant HARMAN INTERNATIONAL INDUSTRIES INCORPORATED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 10 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 09.02.2004	Date of completion of this report 22.12.2004
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized Officer Nieuwenhuis, P Telephone No. +49 89 2399-8968



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/07189

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-21 as originally filed

Claims, Numbers

1-106 as originally filed

Drawings, Sheets

1/13-13/13 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3)..

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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International application No. **PCT/EP 03/07189**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☐ restricted the claims.
☒ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☐ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	6,25,31,39,50-58,88-99
	No: Claims	1,2,7-9,13-16,18,19,26-28,32-38,40,41,61,62,73,100
Inventive step (IS)	Yes: Claims	6,25,31,39,50-58,88-99
	No: Claims	3- 5,10- 12,17,20-24,29,30,42-49,59.60,63-72,74-87,101-106
Industrial applicability (IA)	Yes: Claims	1-106
	No: Claims	

2. Citations and explanations

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/07189**

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Invention 1

1. Reference is made to the following documents:

D1: DE 38 31 376 A (KELLER FILIP) 22 March 1990 (1990-03-22)
D2: GB 369 992 A (ERNST OSCAR PERSSON) 21 March 1932 (1932-03-21)
D3: PATENT ABSTRACTS OF JAPAN vol. 011, no. 104 (E-494), 2 April 1987
(1987-04-02) & JP 61 251298 A (PIONEER ELECTRONIC CORP), 8
November 1986 (1986-11-08)

2. Although claims 1,15,26 and 34 have been drafted as separate independent claims, they relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought ..and/or.. in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, claims 1,15,26 and 34 do not meet the requirements of Article 6 PCT.

In the present case the relevant subject-matter should have been defined in terms of a single independent claim in each category followed by dependent claims covering features which are merely optional (Rule 6.4 PCT).

3. Furthermore, insofar as the present text can be understood, the subject-matter of claims 1,15,26 and 34 is not novel in respect of prior art as defined in the regulations (cf. Rule 64(1)-(3) PCT), and therefore does not satisfy the criterion set forth in Article 33(2) PCT.

D1 discloses the subject-matter of independent claims 1, 15, 26 and 34 (see D1: Figs. 1-7 (esp. reference signs. 1 (membrane), 1' and 1'' (tapered coating), column 4, line 52 - column 5, line 34).

Also D2 discloses the subject-matter of independent claims 1 and 15 (see D2: Fig. 4 (esp. reference signs e (membrane) and f (tapered coating) and page 2, lines 84-121).

It is noted that in claims 1 and 26 it is not clear whether the second region needs to be coated at all.

Furthermore, it is noted that in claims 1, 2, 5, 10-14 the first and second regions are only specified to the extent that the second region is radially inward of the first region. In claims 15-21 and 24 the regions are not specified whatsoever.

4. Dependent claims 2-5, 7-14, 16-24, 27-30, 32, 33 and 35-37 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

Regarding claims 2, 16, 18, 19, 27, 28 and 35: See D1: Figs. 3, 4 and 7, and corresponding text.

Regarding claims 3, 4, 22 and 23: The claimed materials have already been employed for the same purpose in a similar diaphragm, see D3, the Abstract. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a diaphragm according to document D1 or D2.

Regarding claim 5 and 24: PCT Guidelines 3-IV, 8.8(C1)(ii).

Regarding claims 10-12, 17, 20, 21 and 30: D1 Fig. 6 and corresponding text.

Although Fig. 6 shows a membrane consisting of one single layer, but considering e.g. col. 4, line 63 - col. 5, line 12, it is clear to the skilled person that the same increase in thickness can be obtained by a membrane with a one or double sided coating.

Regarding claims 7-9, 13 and 14: D1: Figs. 4 and 7, and corresponding text.

Regarding claim 29: Considering that during operation of a loudspeaker the diaphragm is used in, the force exerted on the cylindrical region (i.e. the

bobbin around which the voice coil is wound) in motion remains constant over the region since distance with respect to the voice coil remains constant, the use of a uniform coating on the cylindrical portion to increase the overall stiffness is obvious.

Regarding claims 32 and 33: See D1: Fig.7, and corresponding text.

Regarding claims 36 and 37: In claim 36 and 38 a slight constructional change in the loudspeaker diaphragm of claim 34 is defined which comes within the scope of the customary practice followed by persons skilled in the art.

It is noted that claim 36 is taken to refer to claim 34 instead of 35 since a layer cannot be uniform and at the same time tapered.

5. The combination of the features of either one of dependent claims 6,25 and 31 is neither known from, nor rendered obvious by, the available prior art. The reasons are as follows: The subject-matter of these claims 6,25 and 31 differs from the combination of either one of D1 and D2 with D3 [claims 6 and 25] or from D1 [claim 31] in that the tapered coating is an anodically formed oxide layer. It is noted that the ceramic layer in D3 is obtained by thermalspraying.

Unlike with the processes to obtain the tapered coating in D1 (unspecified, only the presence of a carrier and a supplementary layer is mentioned) and D2 (e.g. variable impregnation, compression, tempering; cf. page 2, lines 96-114), the oxidation results in an increase of the coating at the expense of the base material, resulting in distinct structures and acoustic properties. Hence, these processes cannot be simply exchanged.

Invention 2

1. Reference is made to the following documents:

D4: PATENT ABSTRACTS OF JAPAN vol. 004, no. 107 (P-021), 31 July 1980 (1980-07-31) & JP 55 064602 A (NIPPON COLUMBIA CO LTD), 15 May 1980 (1980-05-15) -& DATABASE WPI Section Ch, Week 198026 Derwent Publications Ltd., London, GB; Class A85, AN 1980-45615C XP002276924 & JP 55 064602 A (NIPPON COLUMBIA CO LTD), 15 May 1980 (1980-05-

15)

- D5: GB 255 736 A (EDGAR BAUER;WMF WUERTTEMBERG METALLWAREN)
29 July 1926 (1926-07-29)
- D6: PATENT ABSTRACTS OF JAPAN vol. 012, no. 403 (E-674), 26 October
1988 (1988-10-26) & JP 63 143000 A (FOSTER DENKI KK), 15 June 1988
(1988-06-15)
- D7: US-B1-6 327 372 (DEVANTIER ALLAN O ET AL) 4 December 2001 (2001-
12-04)
- D8: US 2002/184964 A1 (PEARSALL THOMAS J ET AL) 12 December 2002
(2002-12-12)

2. Although claims 38, 73, 89 and 100 have been drafted as separate independent claims, they relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought ..and/or.. in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, claims 38, 73, 89 and 100 do not meet the requirements of Article 6 PCT.

In order to overcome this objection, it is considered appropriate to file an amended set of claims defining the relevant subject-matter in terms of a single independent claim in each category followed by dependent claims covering features which are merely optional (Rule 6.4 PCT).

In order to avoid unnecessary delay of the procedure, an opinion with respect to novelty and inventive step is given in Item V, above, regarding the claims 38-106. Nevertheless, it should be noted that failure to overcome the above clarity objection could lead to no such opinion being given in the Internationally Preliminary Examination Report regarding those claims.

3. Furthermore, insofar as the present text can be understood, the subject-matter of claims 38,40,41,61,62,73 and 100 is not novel in respect of prior art as defined in

the regulations (cf. Rule 64(1)-(3) PCT), and therefore does not satisfy the criterion set forth in Article 33(2) PCT. D4 discloses a method of anodically oxidizing a tapered layer on an Al substrate (cf. abstract and Figs.5 and 6)). The current density distribution control or progressive reduction in the effective applied voltage is obtained by the gradual and continuous lowering of the substrate in the electrolytic bath.

4. Dependent claims 42-49, 59, 60, 63-72, 74-87 and 101-106 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

Regarding claims 42-49,59,60,72,74-78,101,102: The claimed uses of non-contact masks as claimed in these claimed to control the current density distribution or the progressive reduction in effective applied voltage as claimed in order to control the coating thickness have already been employed for the same purpose in a similar method see document D5, (whole document). It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a method according to document D4, thereby arriving at the methods according to claim 42-49,59,60,72,74-78,101,102 The subject-matter of claim 42-49,59,60,72,74-78,101,102 does therefore not involve an inventive step (Article 33(3) PCT) (see also PCT Guidelines PG-III. 13.14(a)(v)).

Regarding claims 63-71,79-87,103-106: see PCT Guidelines PG-III. 13.14(e)(ii).

5. Document D6, which is considered to represent the most relevant state of the art, discloses (cf. abstract) a method for non-uniform ceramic coating on a loudspeaker diaphragm in which the non-uniform coating is applied in various steps using an so-called electroanalysis method to form the ceramic layer and which involves masking. The subject-matter of claims 39,88 and 89 differs from D6 in that the formation of the non-uniform layer is carried out by anodic oxidation in a single step and controlling the current in the anodizing bath.

The subject-matter of claims 39,88 and 89 is therefore novel (Article 33(2) PCT).

By using this one step process to obtain the anodic coating thus obtaining a non-uniform coating with a more gradual change in thickness of the oxide layer and thus of the metal layer which is oxidized, resulting in a reduction in mechanical stress in the loudspeaker membrane.

D3 discloses a one step method of forming a ceramic coating on a loudspeaker membrane by thermal spraying.

D4 discloses a method of providing a non-uniform ceramic coating by anodic oxidation on a cantilever used for a stylus of a gramophone pick-up. D5 discloses a method of providing a non-uniform ceramic coating by anodic oxidation on cutlery. Considering the remoteness of the of the technical fields of D4 and D5 a skilled person would not consider applying the teachings of either one of D4 and D5 on the loudspeaker membrane of D6.

Claims 55-58 and 90-99 are dependent on claims 39 and 89 respectively and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Certain defects in the international application

1. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
2. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D3 (invention 1) and in the documents D4-D8 (invention 2) are not mentioned in the description, nor are these documents identified therein.